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NOTARO AND MICHALOS
100 DUTCH HILL ROAD
SUITE 110
ORANGEBURG, NY 10962-2100

EXAMINER	
MCDONALD, RODNEY GLENN	

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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Paper No. 20040302

Application Number: 09/362,397
Filing Date: July 28, 1999
Appellant(s): KUGLER, EDUARD

Peter Michalos
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed November 12, 2003.

(1) Real Party in Interest

A statement identifying the real party in interest is contained in the brief.

(3) Status of Claims

The statement of the status of the claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

The summary of invention contained in the brief is correct.

(6) Issues

The appellant's statement of the issues in the brief is correct.

(7) Grouping of Claims

Appellant's brief includes a statement that claims 91-149 do not stand or fall together and provides reasons as set forth in 37 CFR 1.192(c)(7) and (c)(8).

(8) Claims Appealed

The copy of the appealed claims contained in the Appendix to the brief is correct.

(9) Prior Art of Record

5,414,678	Challener, IV	5-1995
5,292,417	Kugler	3-1994
5,240,581	Kim	8-1993
4,428,811	Sproul et al.	1-1984
0 658 885	Imaino et al.	6-1995
0 564 789	Signer et al.	2-1993
0 473 492	Tawara et al.	3-1992
59-73413	Takei et al.	4-1984

(10) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claims 91-149 are rejected under 35 U.S.C. 103 and the rejections that apply under 35 U.S.C. 103 to these claims are set forth in prior Office Action dated June 24, 2003 and are set forth in their entirety below.

Claims 91, 98, 99 and 103-105 are rejected under 35 U.S.C. 103(a) as being unpatentable over Challener, IV (U.S. Pat. 5,414,678) in view of Kim (U.S. Pat. 5,240,581).

Substrate 14 is preferably transparent, has very low birefringence, and is nominally 1.2 mm thick. Suitable materials include glass, polycarbonate, polymethylmethacrylate, and amorphous polyolefin (APO). (Column 4 lines 56-59)

Dielectric layers 16, 20, and 24 preferably have an index of refraction having a real component, n, between 1.5 and 3 and an imaginary component, K, less than 0.2. Dielectric layers 16, 20, and 24 may comprise ***silicon nitride (SiN), silicon carbide (SiC.sub.x)***, silicon oxide (SiO.sub.x), yttrium oxide (YO.sub.x), aluminum nitride (AlN), silicon aluminum oxynitride (SiAlON), ***or similar materials***. Dielectric layers 16, 20, and 24 preferably have thicknesses within the range of 10-150 nm. (Column 4 lines 60-68)

Recording layers 18 and 22 preferably comprise a rare-earth transition metal alloy, such as terbium-iron-cobalt TbFeCo). The Curie temperature of recording layers 18 and 22 may be varied by changing the amount of cobalt present in the alloy. (Column 5 lines 1-5)

Reflecting layer 26 preferably comprises aluminum or aluminum doped with chromium (AlCr.sub.0.03) having a thickness within the range of 50 to 200 nm. As explained in the Background of the Invention, ***the addition of a second recording***

layer increases the storage capacity of the magneto-optic medium by just 50%, instead of doubling the capacity, because the Kerr rotation of the up-down configuration is the same as that for the down-up configuration (both of which are zero). (Column 5 lines 6-14)

With the medium initialized in the up-down state, the entire medium may be recorded with a recording field in the "down" direction using a high laser power. This records bits in the standard manner in the "up" layer while leaving the "down" layer in the erased state, even though it is heated above its Curie temperature. After recording the entire medium (or perhaps just a single track), the magnetic polarity of the recording field is reversed. A lower laser power is then used to record bits in the standard manner in the "down" layer without affecting the recorded bits in the other recording layer, resulting in independent information being stored in the two layers. By using the two read channels, all four magnetic states (up-up, down-down, up-down, and down-up) can be read simultaneously. (Column 5 lines 31-45)

The difference between Challener, IV and the present claims is that depositing the silicon nitride layer by sputtering is not discussed.

Kim et al. teach formation of a silicon nitride layer by sputtering in a nitrogen atmosphere for a magneto-optical recording medium. (Kim et al. Column 4 lines 10-22) The sputtering apparatus is provided with a sputter chamber that can house one or more magnetron sputter sources. (Column 2 lines 63-65)

The motivation for depositing a silicon nitride layer in recording medium is that it allows for use of a layer with consistent refractive index. (Column 1 lines 64-68; Column 2 lines 1-2)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Challener, IV by utilizing a reactive sputtering process to deposit the silicon nitride layers as taught by Kim et al. because it allows for use of a layer with consistent refractive index.

1. Claims 95 and 100 are rejected under 35 U.S.C. 103(a) as being unpatentable over Challener, IV in view of Kim as applied to claims 91, 98, 99 and 103-105 above, and further in view of Kugler (U.S. Pat. 5,292,417).

The differences not yet discussed is the use of AC superimposed over DC, feedback control and doping.

Kugler teach a method and apparatus for performing the method comprising a vacuum treatment chamber containing a target of ohmic conductive material. The target and a workpiece are supported by suitable electrodes. Superimposed DC and AC power is applied to the target to generate a glow discharge in the chamber in which the target is sputtered. Particles sputtered off the target react with a reactive gas in the space between the target and workpiece and the reaction product is deposited upon the workpiece. (See Abstract)

It has been recognized that, principally, when reactive AC and DC sputtering a target of low electric conductivity, such as and especially as of Si, which is doped in

order t o increase its conductivity, doping be phosphorus leads to a significantly lower tendency of arcing and splashing at a poisoned target. (Column 6 lines 63-68)

According to the schematic illustration, a negative feed back control circuit for stabilizing sputtering and coating process is provided. It includes an actual value sensing device 22, including one or several sensors of the following, optical sensor, absorption-emission-fluorescence spectrographic sensor, sensor for detecting light emission, plasma monitoring sensor, discharge impedance sensor, partial pressure sensor. (Column 12 lines 25-37)

The output signal of the actual value sensing device 22 is sent to a conditioning and evaluating unit 24, 26. After the signal has been conditioned, the actual value signal S is led to a difference measuring unit 28. Here the control difference relative to a preset rated value W is generated, which latter may be set by unit 30. (Column 12 lines 38-43)

The control difference acts via controllers (not illustrated) for optimizing the control of a process value, i.e. the regulated value, and which reacts speedily. Preferably one or several of the following physical values listed below are used as the regulated value and are set by respective regulating means: DC power, AC frequency, AC frequency, AC frequency spectrum, ratio of AC power/ DC power, mass flow of reactive gas, gas mixture, mass flow of process gas. (Column 12 lines 44-58)

The motivation for superimposing AC over DC, providing negative feedback control and providing a doped target is that it allows for production of high quality coatings. (Column 7 line 15)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have superimposed AC over DC during deposition, utilized negative feedback control and dope the silicon target as taught by Kugler because it allows for production of high quality coatings.

2. Claims 96 and 97 are rejected under 35 U.S.C. 103(a) as being unpatentable over Challener, IV in view of Kim and further in view of Kugler as applied to claims 91, 95, 98, 99, 100 and 103-105 above, and further in view of Signer (EP 0 564 789).

The differences not yet discussed is applying a pulsating AC voltage and intermittently connecting the carrier to different voltage paths.

Signer et al. teach a method of treating a workpiece in a vacuum atmosphere in which ions are produced and driven against the at least partially insulated surface (4) of a workpiece (2b) and cause electrostatically charged surface, a short circuit between the partially insulated workpiece and the other conductive surface is intermittently produced to neutralise collected charge on the insulated layer. The neutralised ions remain accumulated on the surface and are suitable for ion plating. In sputter coating and etching processes. (See Abstract) The Figures demonstrate providing pulsing AC power and intermittently connecting the carrier to different voltage paths. (See Figures)

The motivation for utilizing a pulsating AC voltage and intermittently connecting the carrier to different voltage paths is that it avoids the need for expensive high frequency generators to be included in the circuit to neutralize the electrostatic charge. (See Abstract)

Therefore, it would have been obvious to one of ordinary skill in the art to have applied a pulsating AC voltage and intermittently connected the carrier to different voltage paths as taught by Signer et al. because it is desired to neutralize electrostatic charge.

3. Claims 101 and 102 are rejected under 35 U.S.C. 103(a) as being unpatentable over Challener, IV in view of Kim as applied to claims 91, 98, 99 and 103-105 above, and further in view of Takei et al. (Japan 59-73413).

The differences not yet discussed is the deposition of silicon nitride in ammonia. Takei et al. teach a mixed gas of an inert gas such as Ar, etc. and a nitrogen-containing gas such as nitrogen gas or ammonia gas is introduced from the gas bomb 6 through the gas flow rate regulator 5 and the pipe 4 to the vacuum container 1 evacuated by the vacuum pump 2, and sputtering is carried out by irradiating the target 7 consisting of silicon or silicon nitride with ionic beam from the ionic beam generator 3 set in the container 1. Consequently, the target is irradiated with nitrogen ion or an ion of nitrogen atom-containing gas, to form an insulating material of thin film consisting of substantially amorphous silicon nitride. (See Abstract)

The motivation for utilizing ammonia to sputter is that allows the formation of a film having denseness. (See Abstract)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have utilized ammonia as a reactive gas for sputtering as taught by Takei et al. because it allows for formation of a film having denseness.

4. Claims 92, 93 and 106 are rejected under 35 U.S.C. 103(a) as being

unpatentable over Challener, IV (U.S. Pat. 5,414,678) in view of Tawara et al. (EP 0 473 492).

Challener, IV is discussed above and all is as applies above. (See Challener, IV discussed above)

The difference between Challener, IV and the present claim is that the dielectric layer being SiNH is not discussed.

Tawara et al. teach an improvement in the stability and durability can be obtained in a magneto-optical recording medium having a multi-layered structure consisting of a transparent substrate plate, a first dielectric layer, a magnetic layer, a second dielectric layer and a reflecting layer by providing a protective coating film on the surface of the substrate plate opposite to the first dielectric layer with an inorganic substance selected from the group consisting of silicon nitride, silicon carbide, titanium dioxide, indium-tin oxide, ***silicon nitride containing hydrogen***, silicon carbide containing hydrogen, silicon carbide nitride containing hydrogen, calcium fluoride and magnesium fluoride. (See Abstract)

The magneto-optical recording medium as the subject body of the inventive improvement has a multi-layered structure as is illustrated in Figure 1 by a cross section, in which a transparent substrate plate 1 made from a poly carbonate resin, polyolefin resin, poly(methyl methacrylate) resin and the like is successively coated with a first transparent dielectric layer 2 of silicon nitride, silicon carbide, silicon nitride containing hydrogen, silicon carbide containing hydrogen, silicon carbide nitride containing hydrogen and the like having a thickness of 20 to 300 nm, a magnetic layer 3

of an amorphous ferrimagnetic alloy which is a combination of at least one rare earth element and at least one transition metal element in a thickness of 20 to 100 nm, a second dielectric layer 4 which can be made from the same substance and has about the same thickness as the first dielectric layer 2 and reflecting layer 5 made from a metal such as aluminum, copper gold, silver and the like having a thickness of 30 to 100 nm. (Column 2 lines 50-58; Column 3 lines 1-15)

According to the invention, a protective coating film 6 of a specific inorganic substance is formed on the surface of the substrate plate 1 opposite to the first dielectric layer 2 or, when the first dielectric layer 2 is omitted, to the magnetic layer 3 having a thickness of 10 to 2000 nm or, preferably, 20 to 300 nm. The inorganic substance forming the protective coating film 6 is selected from the group consisting of silicon nitride, silicon carbide, titanium dioxide, indium-tin oxide, silicon nitride containing hydrogen, silicon carbide containing hydrogen, silicon carbide nitride containing hydrogen, calcium fluoride and magnesium fluoride. The coating film of such an inorganic substance can be formed by the method of sputtering, chemical vapor deposition or vacuum vapor deposition well known in the art. (Column 3 lines 26-41)

A magneto-optical recording medium was prepared by successively forming, on one surface of a substrate plate of polycarbonate resin having a thickness of 1.2 mm, a first dielectric layer of hydrogen containing silicon carbide having a thickness of 110 nm as formed by the method of sputtering. (Column 4 lines 20-26)

The motivation for utilizing a dielectric layer of silicon nitrogen containing hydrogen is that it allows for increasing the stability and durability of the magneto-optical recording medium. (See Abstract)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Challener, IV by utilizing a layer of silicon nitride containing hydrogen as taught by Tawara et al. because it allows for increasing the stability and durability of the magneto-optical recording medium.

5. Claims 94, 95 and 98-100 are rejected under 35 U.S.C. 103(a) as being unpatentable over Challener, IV in view of Tawara et al. as applied to claims 92, 93 and 106 above, and further in view of Kugler (U.S. Pat. 5,292,417).

The differences not yet discussed is the use of AC superimposed over DC, feedback control and doping.

Kugler is discussed above and teach AC superimposed over DC, feedback control and doing. (See Kugler discussed above)

The motivation for superimposing AC over DC, providing negative feedback control and providing a doped target is that it allows for production of high quality coatings. (Column 7 line 15)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have superimposed AC over DC, provided negative feedback control and provided a doped target as taught by Kugler because it allows for production of high quality coatings.

6. Claims 96 and 97 are rejected under 35 U.S.C. 103(a) as being

unpatentable over Challener, IV in view of Tawara et al. and further in view of Kugler as applied to claims 92, 93 and 106 above, and further in view of Signer (0 564 789).

The difference not yet discussed is applying a pulsating AC voltage and intermittently connecting the carrier to different voltage paths.

Signer is discussed above and teach applying a pulsating AC voltage and intermittently connecting the carrier to different voltage paths. (See Signer discussed above)

The motivation for utilizing a pulsating AC voltage and intermittently connecting the carrier to different voltage paths is that it avoids the need for expensive high frequency generators to be included in the circuit to neutralize the electrostatic charge. (See Abstract)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have utilized a pulsating AC voltage and intermittently connecting the carrier to different voltage paths is that it avoids the need for expensive high frequency generators to be included in the circuit to neutralize the electrostatic charge as taught by Signer because it allows neutralizing electrostatic charge.

7. Claims 107-118, 123-125, 130-135, 137-140 and 143-149 are rejected under 35 U.S.C. 103(a) as being unpatentable over Challener, IV (U.S. Pat. 5,414,678).

Challener, IV is discussed above and all is as applies above. (See Challener, IV discussed above)

The difference between Challener, IV and the present claims is that the optical thickness with respect to the wavelength of radiation is not discussed.

As to the optical thickness since the optical thickness is given to be in the range of 10-150 nm which allows for selection of an optical thickness in that range. (Column 4 lines 67-68)

The motivation for selecting the optical thickness is that it allows for developing a magneto-optical recording medium with increased storage density. (Column 1 line 61)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have selected the optical thickness as taught by Challener, IV because it allows for developing a magneto-optical recording medium with increased storage density.

8. Claims 119, 120, 126 and 127 are rejected under 35 U.S.C. 103(a) as being unpatentable over Challener, IV as applied to claims 107-118, 123-125. 130-135. 137-140 and 143-149 above, and further in view of Imaino (EP 0 658, 885).

The differences not yet discussed is the use of lacquer and glue.

Imaino et al. teach in Fig. 2A a cross-sectional view of medium 12. Medium 12 has a substrate 50. Substrate 50 is also known as a face plate or cover plate and is where the laser beam enters medium 12. Face plate 50 and substrates 56, 62, 68 and 74 are made of a light transmissive material such as polycarbonate or other polymer material or glass. (Page 4 lines 3-14)

Fig. 2B is a cross-sectional view of an alternative embodiment of a highly transmissive optical recording medium and is designated by the general reference number 120. Elements 120 which are similar to elements of medium 12 are designated by a prime number. Medium 120 does not have the rims and spaces 78 of medium 12.

Instead, a plurality of solid transparent members 122 separates the substrates. In a preferred embodiment, the members 122 are made of a highly transmissive ***optical cement*** which also serves to hold the substrate together The thickness of members 122 is preferably approximately 10-500 microns. Medium 120 may be substituted for medium 12 in system 10. Medium 120 may also be made of different numbers of data surfaces by adding or subtracting substrates and transparent members. For example, a two-data surface medium comprises face plate 50', member 122 and substrate 56'. (Page 4 lines 35-44)

Fig. 3A shows a detailed cross-sectional view of a portion of disk 12 of Fig. 2A. Substrate 50 contains the embedded information in the data surface 90 and is covered by a thin film layer 124. Layer 124 is made of a material which exhibits low light absorption at or near the wavelength of a light used in the optical system. For light in the range of 400-850 nm in wavelength, materials such as semiconductors are used for layer 124. The thickness of thin film layer 124 is in the range of 25-5000 angstroms. Layer 124 is preferably spin coated onto surface 90. (Page 4 lines 45-50)

Fig. 3B shows a detailed cross-sectional view of a portion of the disk 120 of Fig. 2B. The layers 124' are deposited onto data surfaces 90' and 92', respectively. The member 122 separates the layers 124'. There is no need for a protective layer in this embodiment because member 122 serves as the protective layer. (Page 5 lines 5-8)

The thin film layers 124 are used to provide desired amounts of light reflectivity at each data surface. However, because there are multiple data surfaces through which the light passes the thin layers 124 must also be highly transmissive and absorb as little

light as possible. These conditions can be met when the index of refraction (n) is greater than the extinction coefficient (k) and particularly when the index of refraction (n) is relatively high (n> 1.5) and the extinction coefficient (k) is relatively low (k < 0.5). Such conditions occur in certain materials over certain frequency ranges. One region where these conditions can be met is on the high wavelength side of an anomalous dispersion absorption band. (Page 5 lines 9-15)

Amorphous silicon has been found to be a good material for use as layer 124 where light in the wavelength range of 400 - 850 nm is used. The thickness of thin film layer 124 is in the range 25-5000 Angstroms. (Page 5 lines 24-25)

Other semiconductor materials in addition to amorphous silicon may e used for layer 124. Any of group IVA elements from the periodic table may be used such as C, Si, Ge, Sn, Pb or combinations thereof. (Page 5 lines 30-31)

These semiconductor materials are deposited as layer 124 in a sputtering process. (Page 5 line 39)

The motivation for utilizing lacquer and glue (i.e. optical cement) is that it allows for formation of optical data medium (See Abstract)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have formed an information carrier with lacquer and glue as taught by Imaino because it allows formation of optical data medium.

9. Claims 121 and 122 are rejected under 35 U.S.C. 103(a) as being unpatentable over Challener, IV as applied to claims 107-118, 123-125. 130-135. 137-140 and 143-149 above, and further in view of Sproul et al. (U.S. Pat. 4,428,811).

The difference not yet discussed is where the dielectric layer is a zirconium nitride layer.

Sproul et al. teach depositing a zirconium nitride layer from targets of zirconium in a nitrogen atmosphere. (Column 8 lines 25-33)

The motivation for depositing a layer of zirconium nitride is that it allows for a protective hardness layer. (Column 8 lines 18-21)

Therefore, it would have been obvious to one of ordinary skill in the art to have deposited a zirconium nitride layer as taught by Sproul et al. because it allows for depositing a protective hardness layer.

10. Claims 128 and 129 are rejected under 35 U.S.C. 103(a) as being unpatentable over Challener, IV as applied to claims 107-118, 123-125. 130-135. 137-140 and 143-149 above, and further in view of Kugler (U.S. Pat. 5,292,417).

The differences not yet discussed is the use of AC superimposed over DC, feedback control and doping.

Kugler is discussed above and teach AC superimposed over DC, feedback control and doing. (See Kugler discussed above)

The motivation for superimposing AC over DC, providing negative feedback control and providing a doped target is that it allows for production of high quality coatings. (Column 7 line 15)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have superimposed AC over DC, provided negative

feedback control and provided a doped target as taught by Kugler because it allows for production of high quality coatings.

11. Claims 136, 141 and 142 are rejected under 35 U.S.C. 103(a) as being unpatentable over Challener, IV as applied to claims 107-118, 123-125. 130-135. 137-140 and 143-149 above, and further in view of Tawara et al. (EP 0 473 492).

The differences not yet discussed is the use of SiCH.

Tawara et al. is discussed above and teaches the use of SiCH. (See Tawara et al. discussed above)

The motivation for utilizing SiCH is that it allows for the production of a magneto-optic recording medium with stability and durability. (See Abstract)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have utilized a layer of SiCH as taught by Tawara et al. because it allows for producing a magneto-optic recording medium with stability and durability.

(11) Response to Argument

At the outset it should be noted that some groupings of the claims have been merged since they are directed to similar arguments. It also should be noted that merely pointing out differences in what the claims cover is not an argument as to why the claims are separately patentable from the references.

GROUP A (Claims 91, 103, 104) -

In response to the argument that Challener does not teach utilizing a vacuum coating process to deposit the Silicon Nitride layer comprising the step of freeing the Si from a solid body into a process atmosphere with a reactive gas containing N, it is argued that Challener does teach a silicon nitride layer between two information layers which Appellant readily admits. It is agreed that there is no disclosure in Challener of the method in which the silicon nitride layer is formed. However one of ordinary skill in the art would readily envisage that a coating process would be required to put down the silicon nitride layer in Challener and that utilizing a known reactive vacuum coating process which Kim the secondary reference suggests would be viable method. The reference to Kim teach depositing silicon nitride by sputtering from a target of silicon material (i.e. a solid body of silicon) in a nitrogen and argon atmosphere to form a silicon nitride layer. Kim's silicon nitride layer is also utilized in the same field of endeavor in that it is a layer utilized in recording medium production. (See Challener and Kim discussed above)

In response to the argument that utilizing Kim's method would be difficult to reach the higher requirements for intermediate layers between two recording layers, it is

argued that while Appellant alleges that Kim's method would be difficult to reach higher requirements for intermediate layers it is still believed that Kim's method would reach the higher requirements based on gas flow control during sputtering in order to control the thickness of the deposited film and thus effect the refractive index of the layer. Kim demonstrates control of gas flow during sputtering in Figures 3 and 4. (See Kim discussed above)

GROUP B (Claims 92, 103, 104) -

In response to the argument that Challener does not teach depositing a SiNH layer by means of a reactive coating vacuum process in a process atmosphere by adjusting the concentration of reactive gases, it is argued that while Challener as discussed above is absent a teaching of a reactive vacuum coating process to put down layers one of ordinary skill in the art would readily envisage that a reactive vacuum coating process would be required to put down the silicon nitride layer in Challener and that utilizing a known reactive vacuum coating process which Tawara the secondary reference teaches would be a viable method to achieve such layer production. Tawara teach that among the methods to be chosen sputtering and chemical vapor deposition can be utilized. Both methods are known reactive vacuum coating processes and both processes (i.e. CVD or sputtering) can utilize reactive gases to achieve desired layer compositions. This is admitted by Appellant in their argument on Page 32. (See Tawara discussed above; Appellant's Brief Page 32)

In response to the argument that Tawara does not expressly teach utilizing reactive gases to form the hydrogen containing silicon nitride, while not expressly

teaching utilization of reactive gases Appellant admits that there is an implication from Tawara to utilize reactive gases to achieve such compositions. Furthermore at least CVD would require reactive gases since CVD is deposition from vapor chemicals (i.e. **C**hemical **V**apor **D**eposition). (See Tawara discussed above; Appellant's Brief Page 32)

GROUP C (Claim 93) –

In response to the argument that Tawara does not teach freeing Si from a solid body, it is argued that the deposition process "sputtering" requires a solid body to deposit from and that it is in the form of a target. (See Tawara discussed above)

GROUP D (Claim 94) –

In response to the argument that there is no gas ratio control taught by Challener or Tawara, it is argued that the secondary reference to Kugler suggest the ratio control of reactive gas to inert gas. (See Kugler discussed above)

In response to the argument that ratio control of nitrogen to hydrogen is not suggested by Kugler, it is argued that while Kugler does not teach the reactive gases of nitrogen and hydrogen Kugler do suggest that control of reactive gases is important and one of ordinary skill in the art would readily envisage controlling nitrogen and hydrogen because Kugler recognize controlling reactive gases. (See Kugler discussed above)

GROUP E, F, G, H (Claims 95-102) -

In response to the argument that the combination of references are not combinable because the references do not recognize the criticality of forming an intermediate layer between information layers, it is argued that Challener teach the criticality of forming the intermediate layer between recording layers and that the other

references are relied upon to teach deposition methods to form the layers. (See Challener discussed above)

GROUP I (Claim 105)-

In response to the argument that the references do not recognize thickness in terms of wavelength of the reading of writing radiation, it is argued that Challener teach that the preferable thicknesses of the layer be between 10-150 nm and that one could select a wavelength to operate in this range. (See Challener discussed above)

GROUP J (Claim 106)-

In response to the argument that Tawara does not teach utilizing a silver layer between one of the solid material interfaces and the intermediate layer, it is argued that this would be obvious if one wanted to reflect the wavelength of light which is the requirement for having a silver layer. (See Tawara discussed above)

GROUP K, L, Q, R (Claims 107, 108, 114, 115, 116, 119, 120, 131)-

In response to the argument that Challener does not teach the calculation for the layer thickness nor the expanded tolerance for "m", it is argued that Challener teaches utilizing a preferable thickness of 10-150 nm and that one could use a thickness in this range to meet the calculation expression and the expanded tolerance. (see Challener discussed above)

GROUP M (Claims 109, 113, 117)-

In response to the argument that Challener does not teach anything about the reflection of radiation at the information layer, it is argued that the reflection of the radiation is based upon the wavelength of light selected and that since Challener teach

the required recording layers one could select a wavelength of light to achieve the desired reflection. Furthermore the selection of the wavelength of light does not relate to the method of making the recording disk. (See Challener discussed above)

GROUP N (Claims 110, 118)-

In response to the argument that Challener does not teach acceptable optical qualities of the intermediate layers, it is argued that Challener does teach forming at least silicon nitride which Appellant's require having a thickness of from 10 to 150 nm which is believed will meet Appellant's required optical quality based on the material deposited and the thickness involved. (See Challener discussed above)

GROUP O (Claims 111)-

In response to the argument that Challener does not teach generalized compounds of SiC and SiN, it is argued that Challener does suggest that "similar materials" to silicon nitride and silicon carbide be used. This is believed to include compounds of SiC and SiN. (see Challener discussed above)

GROUP P (Claim 112)-

In response to the argument that Challener does not teach the locally modulate characteristic of the solid material body defining at least one interface, it is argued Challener do teach the solid material body having at least one interface and that in order to record information it would be modulated by the wavelength of light. (See Challener discussed above)

GROUP S (Claims 123-127)-

In response to the argument that Challener in combination of Imaino does not teach the combination of reflective layers with the cement layers and intermediate layers, it is argued that if the lacquer was inserted into Challener it would be between the reflective layer and intermediate layer. (See Challener discussed above)

GROUP T (Claims 121 and 122)-

In response to the argument that Sproul is nonanalogous to Challener it is argued that Sproul was relied upon to teach a known deposition method and in that sense it would be useable to teach laying down layers on a substrate. (See Sproul and Challener discussed above)

GROUP U (Claims 128-130)-

In response to the argument that Kugler does not teach a doped intermediate layer between two recording layers, it is argued that since Kugler suggest doping a target that sputtering from a silicon doped target would produce a film having a doping element in it. (Se Kugler discussed above)

GROUP V (Claims 132-147)-

In response to the argument that the combination of Challener and Tawara do not contemplate the specific formulations for the intermediate layers, it is argued that Challener suggest that similar materials for the layers can be utilized and therefore this suggests other specific formulations for the materials. (see Challener discussed above)

GROUP W (Claims 148 and 149)-

In response to the argument that the Challener fail to teach the increased storage, it is argued that the storage of Challener would be equal to Appellant's storage

since Challener suggest the same structure as required by Appellant's claims. (See Challener discussed above)

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,
Rodney G. McDonald
Primary Examiner
Art Unit 1753

RM
March 2, 2004

Conferees
Nam X. Nguyen

Patrick Ryan

NOTARO AND MICHALOS
100 DUTCH HILL ROAD
SUITE 110
ORANGEBURG, NY 10962-2100